

Better Buildings Residential Network Peer Exchange Call Series:

The State of Gas Energy Efficiency Programs March 12, 2020



Agenda and Ground Rules

- Agenda Review and Ground Rules
- Opening Poll
- Residential Network Overview and Upcoming Call Schedule
- Featured Speakers:
 - Sapna Gheewala, American Gas Association
 - Phil Madnick, Consolidated Edison
 - Ray Keller & Arlene Lanciani, Consortium for Energy Efficiency
- Open Discussion
- Closing Poll and Announcements

Ground Rules:

- Sales of services and commercial messages are not appropriate during Peer Exchange Calls.
- 2. Calls are a safe place for discussion; please do not attribute information to individuals on the call.

The views expressed by speakers are their own, and do not reflect those of the Dept. of Energy.





Better Buildings Residential Network

Join the Network

Member Benefits:

- Recognition in media and publications
- Speaking opportunities
- Updates on latest trends
- Voluntary member initiatives
- One-on-One brainstorming conversations

Commitment:

Members only need to provide one number: their organization's number of residential energy upgrades per year, or equivalent.

Upcoming Calls (2nd & 4th Thursdays):

- Mar 26: How Bad Installation Can Negate Good Equipment
- Apr 09: How Hot Is It? Preparing for Summer Cooling Season

Peer Exchange Call summaries are posted on the Better Buildings <u>website</u> a few weeks after the call For more information or to join, for no cost, email <u>bbresidentialnetwork@ee.doe.gov</u>, or go to <u>energy.gov/eere/bbrn</u> & click Join







Sapna Gheewala

American Gas Association



Better Buildings Residential Network

The State of Gas
Energy Efficiency
Programs

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 American Gas Association (AGA) Overview

Natural Gas Market Overview

3. AGA and CEE Energy Efficiency Industry Report

AGA Overview



The American Gas Association (AGA) represents companies delivering natural gas safely, reliably, and in an environmentally responsible way to help improve the quality of life for their customers every day. AGA's mission is to provide clear value to its membership and serve as the indispensable, leading voice and facilitator on its behalf in promoting the safe, reliable, and efficient delivery of natural gas to homes and businesses across the nation.

Committed to utilizing America's abundant, domestic, affordable and clean natural gas to help meet the nation's energy and environmental needs.



Climate Change Position Statement

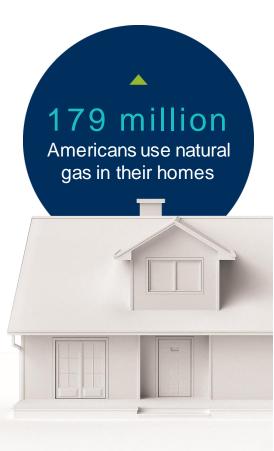
The American Gas Association is committed to reducing greenhouse gas emissions through smart innovation, new and modernized infrastructure, and advanced technologies that maintain reliable, resilient, and affordable energy service choices for consumers.



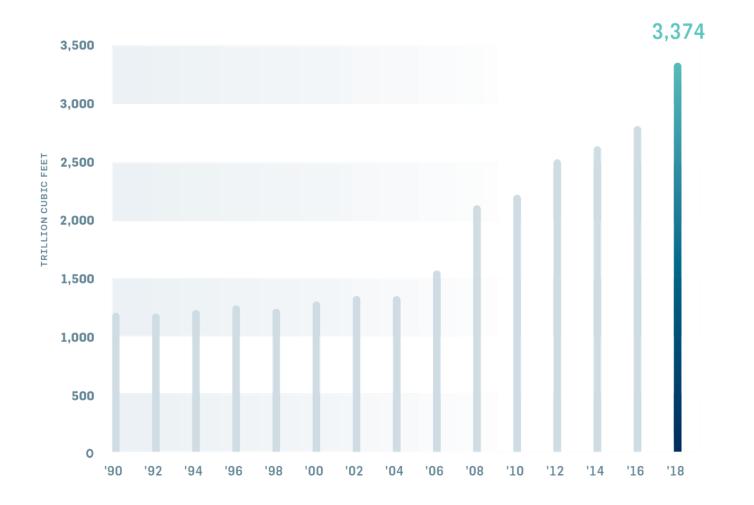
Natural Gas Market Overview

Quick Facts

- Increased use of natural gas has the single largest factor in US energyrelated carbon dioxide emissions reaching **27-year lows.**
- America's natural gas utilities invest \$86.6 million every day on enhancing the safety of natural gas distribution and transmission systems.
- Households that use natural gas for heating, cooking and clothes drying save an average of \$879 per year compared to homes using electricity for those applications.
- Methane emissions from the natural gas distribution system have declined by 73% since 1990
- Natural gas industry supports the employment of 4.1 million Americans
- The U.S. produces more natural gas than any nation in the world, enough to meet our energy needs for more than 110 years.

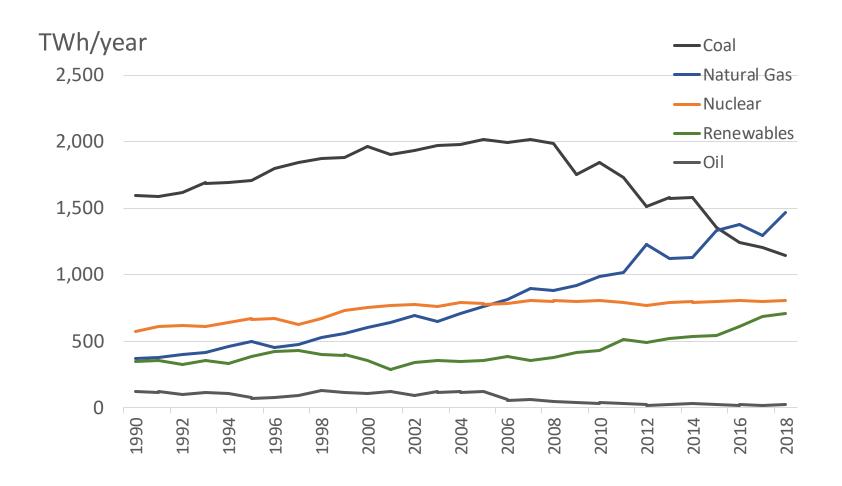


U.S. Natural Gas Resources



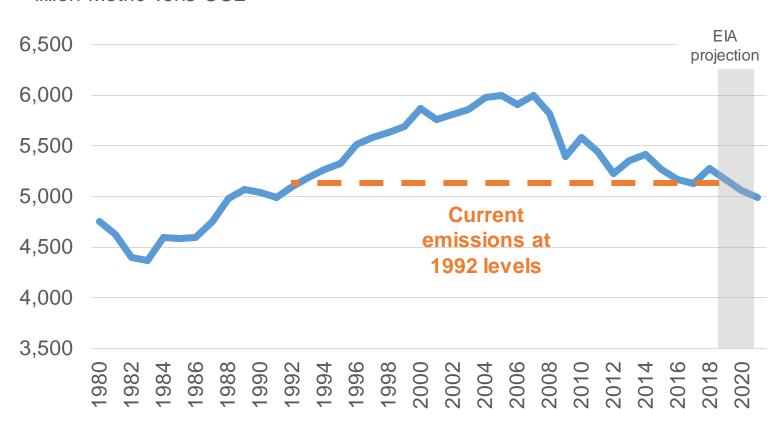


Power Sector Energy Mix



US Carbon Dioxide Emissions from Energy Consumption

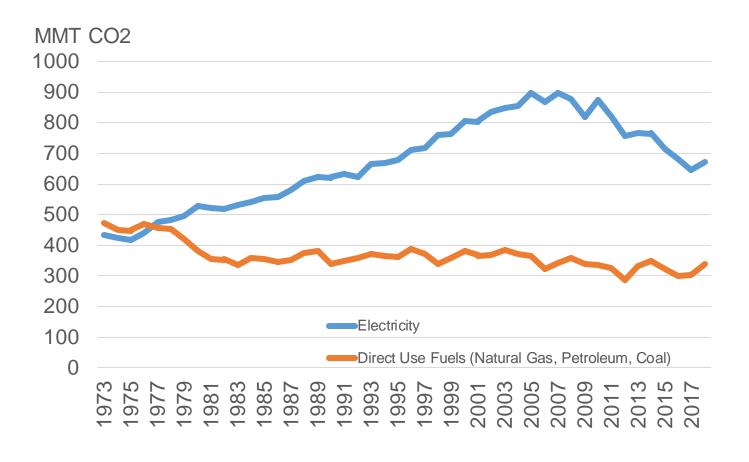
fillion Metric Tons CO2



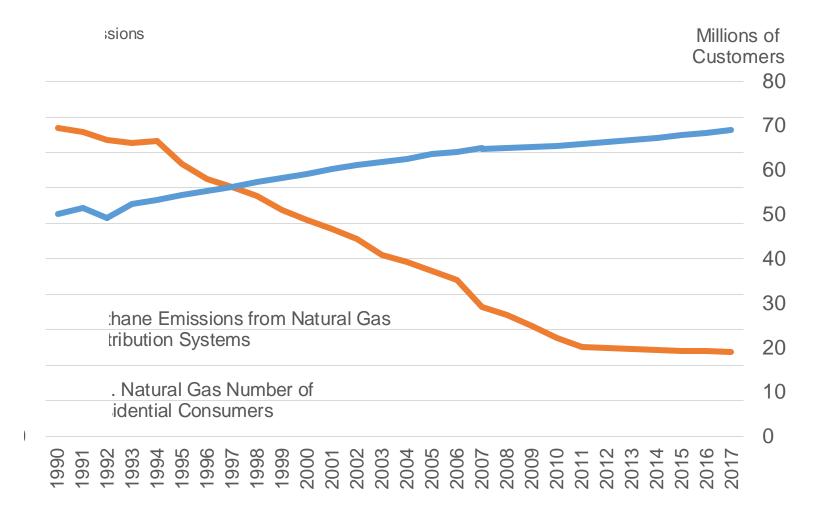


Energy Information Administration. rom EIA Short-Term Energy Outlook January 2020

US Residential Carbon Dioxide Emissions



Natural Gas Methane Emissions

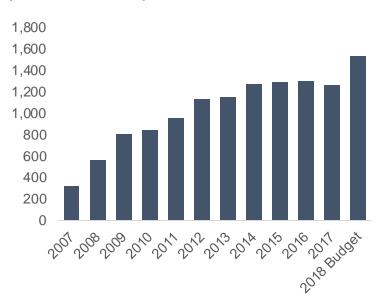


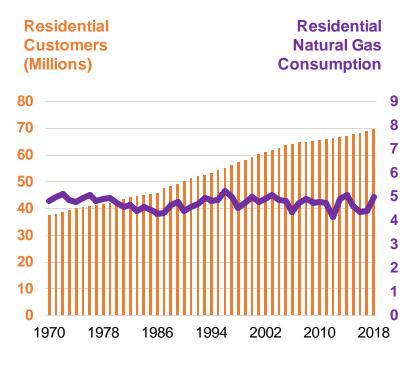




Natural Gas Utilities Energy Efficiency

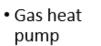
Natural Gas Efficiency Program Investments United States (Million Dollars)





Advancing and Deploying Energy Efficient Technologies in Homes and Buildings

Space Cooling, up to 45% Space Heating, up to 40%





Building Efficiency, 10-45%

- IoT based thermostat
- Building Envelope



Water heating, up to 55%

 Absorption heat pump

Cooking, minimal change

- Gas stove
- · Gas oven







Laundry, 55%

- Gas dryer
- Ozone washing

25-40% GHG reduction potential on a customer basis

Source: Enovation Partners, May 2018



Energy Efficiency Overview

CEE Annual Industry Report

2018 State of the Efficiency Program Industry

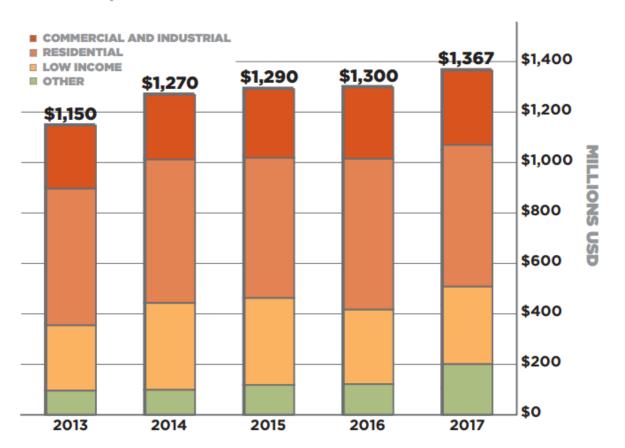
BUDGETS, EXPENDITURES, AND IMPACTS





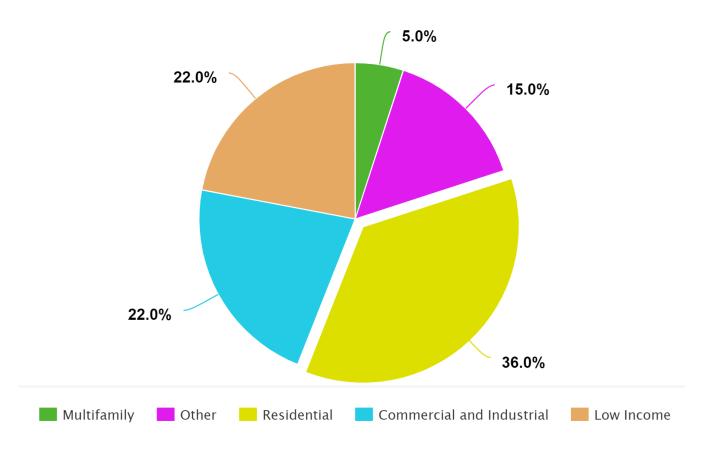
US Natural Gas Utility Energy Efficiency Expenditures 2013-2017

US Natural Gas Expenditures 2013–2017



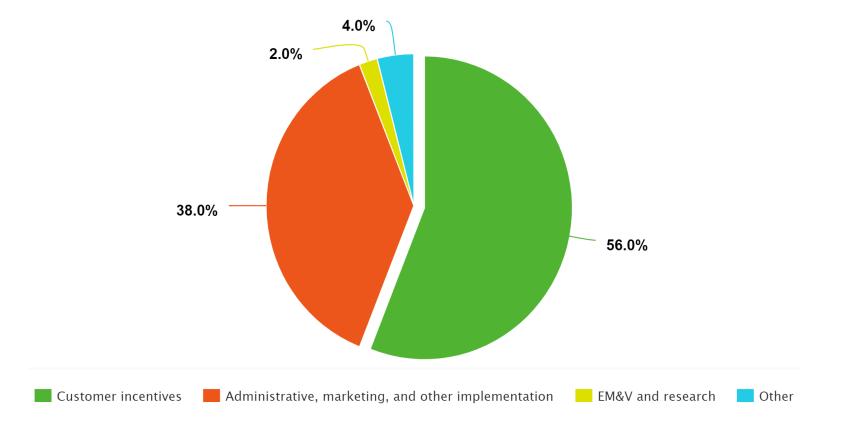


US Natural Gas Utility Energy Efficiency Expenditures by Customer Class 2017



Source: CEE and AGA

US Natural Gas Energy Efficiency Expenditures 2017





Source: CEE and AGA

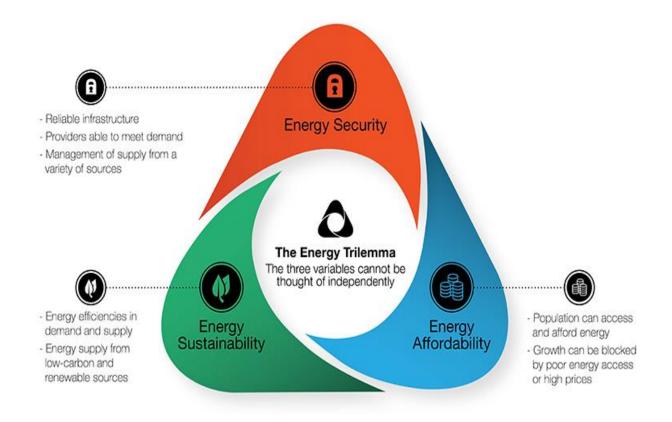
Natural Gas Savings (MillionDth)- 2017

Figure 28 2017 US and Canadian Incremental Natural Gas Savings (MDth)

	RESIDENTIAL	LOW INCOME	MULTIFAMILY	C&I	OTHER	NO BREAKOUT	RATEPAYER TOTAL
UNITED STATES							
NORTHEAST	3,025	607	674	4,375	78	0	8,760
MIDWEST	6,849	587	831	9,697	734	0	18,699
SOUTH	810	36	2	734	0	0	1,581
WEST	2,400	446	211	3,141	6,745	0	12,943
US SUBTOTAL	13,085	1,676	1,718	17,948	10,544	0	44,970
CANADA***	377	181	0	8,639	2,467	0	11,664
BINATIONAL TOTAL	13,461	1,858	1,718	26,586	13,012	0	56,635

Source: CEE and AGA

Natural Gas is a Solution for Solving the "Energy Trilemma"





Find Us Online





- http://twitter.com/AGA_naturalgas
- f www.facebook.com/naturalgas
- www.linkedin.com/company/50905 ?trk=tyah

Sapna Gheewala

Sapna Gheewala is the Energy
Efficiency Manager for the
American Gas Association (AGA).
Sapna works in the Energy Markets,
Analysis and Standards group
providing analytical direction and
support to AGA staff and members
on energy efficiency to strengthen
the role of natural gas in a
sustainable energy future.



sgheewala@aga.org



Phil Madnick
Consolidated Edison



US DOE Better Building Webinar: The State of Gas Energy-Efficiency Programs

March 12, 2020





Agenda

- Customer Targeting
 - Gas constrained regions
 - Customer type and Equipment end-use considerations
- Adaptive Technology Solutions
 - Optimizing steam heat distribution
 - 1. Steam Line Venting
 - 2. Orifice Plates



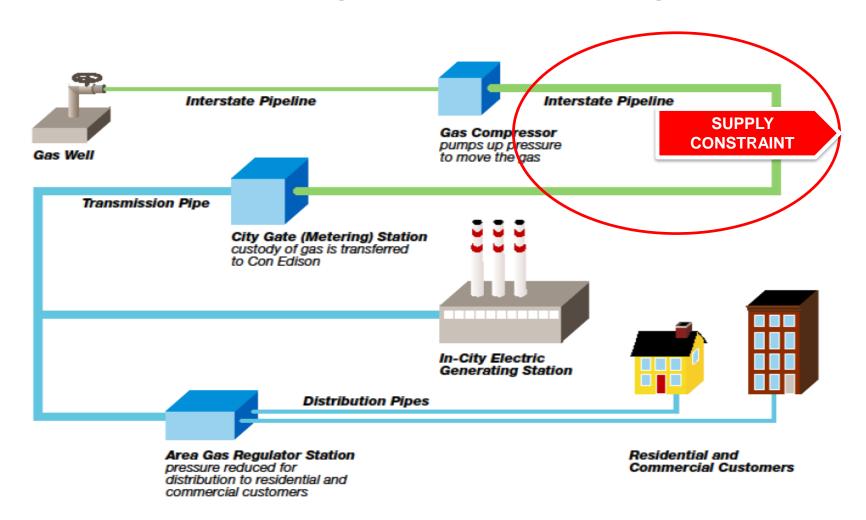
Consolidated Edison Co. of New York, Inc.

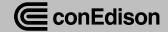
- 3.5 million electric customers
- 1.1 million gas customers
- 1,600 steam customers





Traditional Utility Natural Gas System

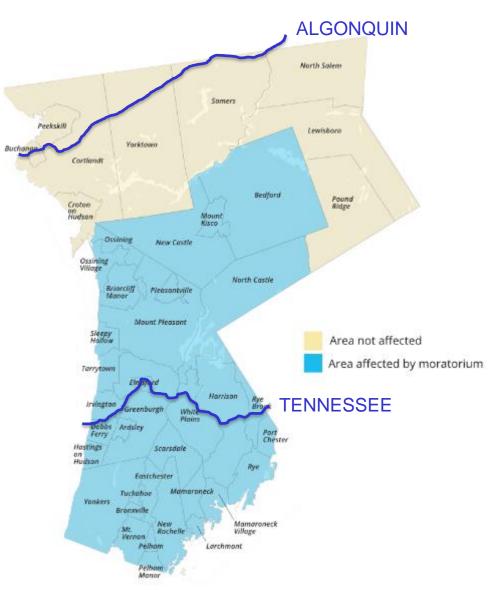




Moratorium Overview

Gas service will be made available for:

- Customers who applied for firm service prior to March 15, 2019 AND meet their project completion timelines;
- Customers seeking gas-fueled, emergency generators for residential use;
- Customers seeking interruptible gas service.





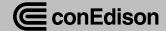
Customer Segmentation

		Moratorium Zone					
Sector	Customer Segmentation	Heating - Fi	rm	Non-Heating Firm			
		Annual Consumption (Dt)	Customer Count	Annual Consumption (Dt)	Customer Count		
	Single Family - Res	11,554,096	86,039	610,860	17,824		
	Small Multi-Family - Res	2,402,740	17,650	441,775	27,934		
	Large Multi-Family Res	1,821,270	7,041	270,583	39,976		
	TOTAL	15,778,106	110,730	1,323,218	85,734		
Multifamily	Multi-Family Common Area	2,901,430	3,934	688,448	2,245		
	TOTAL	2,901,430	3,934	688,448	2,245		
Small Business	Grocery	194,550	346	26,003	132		
	Miscellaneous - Entertainment	560,337	995	88,608	367		
	Nursing Home - Lodging	285,461	312	52,898	132		
	Restaurant	439,211	976	675,500	1,010		
	Small Office	2,185,564	5,334	673,537	2,083		
	Small Retail	510,116	2,132	280,352	488		
	TOTAL	4,175,239	10,095	1,796,898	4,212		
Commercial & Industrial	Education	430,713	505	146,588	194		
	Hospital	114,605	35	2,901	20		
	Large Office	315,728	84	37,648	21		
	Large Retail	176,192	158	32,781	20		
	Warehouse - Indsutrial	747,567	2,120	386,685	483		
	TOTAL	1,784,805	2,902	606,603	738		

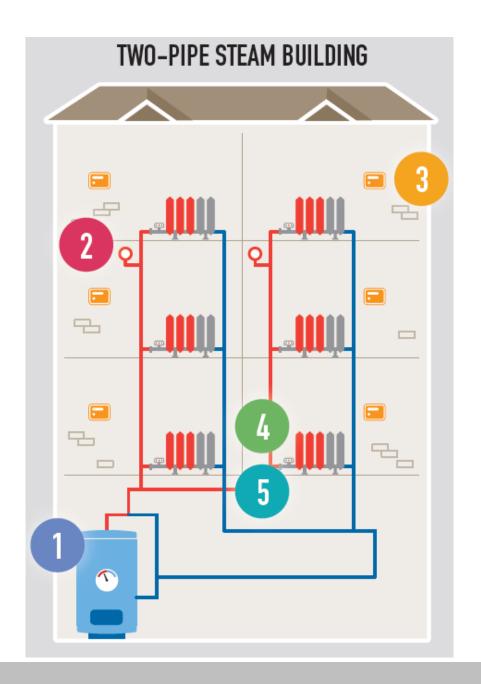


Gas Peak Day Coincident Load Factors

		Equipment End-Use Category				
Sector	Customer Segment	Space Heating	Domestic Hot Water	Interior Equipment (Cooking & Laundry Appliances)	Total Facility	
Residential	Single Family - Res	2.72%	0.33%	NA	2.02%	
	Small Multi-Family - Res	2.72%	0.33%	NA	2.02%	
	Large Multi-Family Res	2.72%	0.33%	NA	2.02%	
	Smart Thermostat Measure	0.70%	NA	NA	NA	
Multifamily	Multi-Family Common Area	4.20%	0.33%	NA	4.20%	
	Boiler Energy Management System Measure	0.82%	NA	NA	NA	
Small Business	Grocery	1.38%	0.30%	0.27%	1.30%	
	Miscellaneous - Entertainment	1.76%	0.33%	0.27%	1.00%	
	Nursing Home - Lodging	0.90%	0.34%	0.27%	0.40%	
	Restaurant	1.59%	0.34%	0.27%	0.89%	
	Small Office	1.31%	0.42%	NA	1.30%	
	Small Retail	1.92%	NA	NA	1.92%	
Commercial & Industrial	Education	1.64%	0.50%	0.36%	1.59%	
	Hospital	0.73%	0.35%	0.27%	0.67%	
	Large Office	1.31%	0.42%	NA	1.30%	
	Large Retail	1.88%	NA	NA	1.88%	
	Warehouse - Indsutrial	2.45%	NA	NA	2.45%	



What do we mean by 'Steam Distribution'?



9

 $\mathbf{1}$

Why is Steam Distribution Efficiency important?

Multifamily Buildings in New York City:

- 64% of the square footage of all building stock
- 54% of the greenhouse gas emissions of all buildings
- 76% are heated by steam
- 49% are pre-war construction
- 25% are classified as affordable housing



^{*} Data sourced from: 1. Retrofitting Affordability by Building Energy Excannge, 2015; 2. Upgrading NYC Steam Systems for the 21st Century by Steven Winters Assoc.



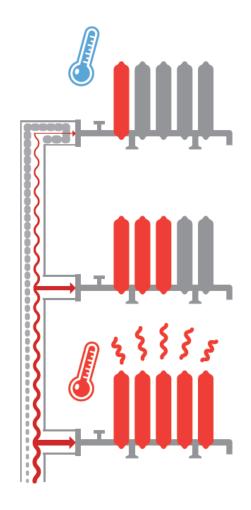


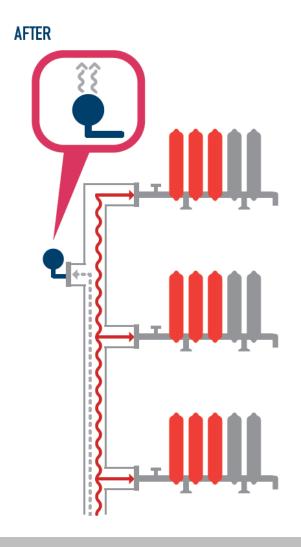
Prescriptive Efficiency Measures:

- Boiler Clean & Tune
- Pipe Insulation
- Steam Trap Repair
- Thermostatic Radiator Valves

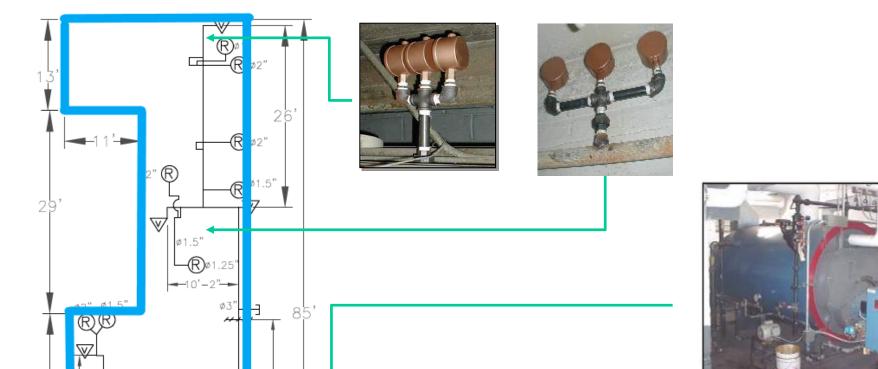
Custom Efficiency Measure #1: Steam-Line Venting

BEFORE







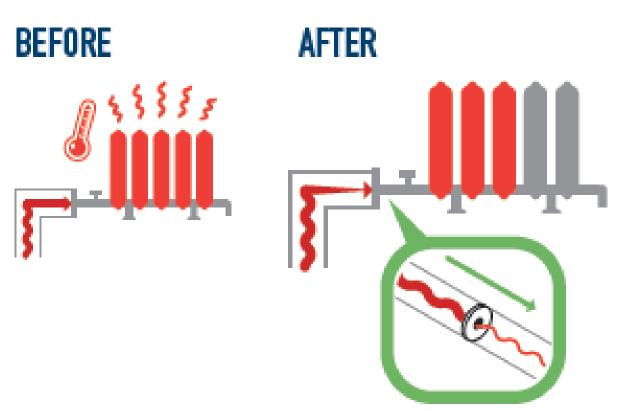


Proposed Venting	Main Lines	
Vent Type	Quantity	Venting Capacity (cfm)
Gorton #2	5	8.75
Gorton D	3	1.62
Hoffman 3	1	0.28
Total Vents	9	
Total Venting Capacity (cfm)		10.65
Vent Time Actual (min)		1.0



Custom Efficiency Measure #2:

Orifice Plates









Ray Keller & Arlene Lanciani
Consortium for Energy Efficiency





As the Consortium for Energy Efficiency,
United States and Canadian efficiency program
administrators develop cutting-edge strategies to
accelerate commercialization of energy
efficient solutions to benefit gas and
electric customers, utility systems,
and the environment.

- CEE was formed to bring new super efficient products and services to the market
- 28 years in, time and location of efficiency has greatly enhanced the opportunity for unprecedented financial, customer, and system benefit

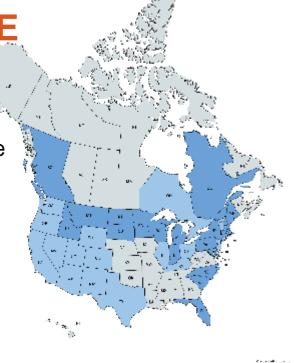
Expanding Gas Participation at CEE

▼ Fifteen gas-only members

Over 37 members with gas service

Over 43M customers

Approximately 80% of EE budgets



CEE Members Working Together

Program Administrators

Ameren Illinois Atmos Energy Corporation Austin Energy Avista Baltimore Gas and Electric Company BC Hydro Berkshire Gas Cape Light Compact Columbia Gas of Massachusetts Columbia Gas of Ohio Commonwealth Edison Company Connecticut Natural Gas Consolidated Edison Company Consumers Energy DC Sustainable Energy Utility (DCSEU) Dominion Energy-Utah DTE Energy **Duke Energy** Efficiency Maine Efficiency Vermont **Enbridge Gas** Énerair **Energy Trust of Oregon** Eversource

Focus on Energy— Wisconsin **FortisBC** Georgia Power Great Plains Natural Gas Hawai'i Energy Hvdro-Québec Idaho Power IESO Los Angeles Department Water & Power Massachusetts Department of Energy Resources Montana-Dakota Utilities National Grid Natural Resources Canada **NB** Power New Jersey Natural Gas New Jersey's Clean Energy Program New Mexico Gas Company New York Power Authority New York State Energy Research and **Development Authority** Nicor Gas Northern California Power Agency **NV Energy**

Oncor

Orlando Public Utilities Pacific Gas and Electric Company PECO Peoples Gas Platte River Power Authority PNM PSEG Long Island Public Service Electric & Gas Puget Sound Energy Sacramento Municipal Utility District San Diego Gas & Electric Company Seattle City Light Snohomish PUD South Jersev Gas Southern California Edison SoCalGas Southern Company Southern Connecticut Gas Southern Minnesota Municipal Power Agency Southwest Gas Tacoma Power Tampa Electric

Tennessee Valley Authority United Illuminating Company Unitil Vectren Corporation—Ohio Vermont Department of Public Service Vermont Gas Xcel Energy **Efficiency Organizations** National Laboratories

American Council for an

Energy-Efficient

California Energy

Economy

Commission California Institute for **Energy and Environment** Fraunhofer Center for Sustainable Energy Systems Lawrence Berkeley National Laboratory Massachusetts Department of Energy Resources National Renewable **Energy Laboratory**

Natural Resources Defense Council Northeast Energy Efficiency Partnerships Northwest Energy Efficiency Alliance Oak Ridge National Laboratory Pacific Northwest National Laboratory Southwest Energy Efficiency Project

Federal Advisors

Natural Resources Canada US DOE US EPA

Gas Sector Priorities

Foster development of the gas efficiency program industry

Residential

- Gas Water Heater Initiative
 - Work with members and trade allies to promote partnerships with installers, distributors and other upstream actors
 - Increase market penetration of high efficiency equipment through alignment of performance specifications in light of new standards and test procedures
- Gas Heating Initiative
 - Support gas savings through quality installation
 - Explore new technologies, capabilities, and program design opportunities

- Boiler System Initiative
 - Develop guidance and Initiative support for savings through controls and hybrid systems
- Water Heating Initiative
 - Explore distribution channel approaches and revised specifications for high efficiency water heaters
- Steam Systems Exploration
 - Highlight the gas savings in steam trap repair and replacement
- Gas Agriculture Exploration
 - Characterize agriculture market and identify savings opportunities, particularly in greenhouses and grain drying



Ray Keller
Senior Program Manager
Sector Lead, Gas Portfolio
Managers, Residential Space
and Water Heating

Commercial and Industrial

^{**} Supplemental project

CEE Portfolio Overview

Cross Cutting

Evaluation, Research, and Behavior

Natural Gas

Emerging Technologies Collaborative

Federal Agency Engagement

New Program Design (part of sector plans)

Connectivity (part of sector plans)

Residential Committees

- Portfolio Managers
- Integrated Home
- Whole House
 - New Construction
 - Existing Homes
- **HVAC**
- Water Heating
- Appliances
- Electronics
- Lighting
- Swimming Pools



Alice
Rosenberg
Sector Lead
Portfolio
Managers, Whole
House (Integrated
Home, Existing
Homes, New
Construction),
Windows, Water
Heating, HVAC



Patrick Casper Program Manager Connected, Integrated Home, Residential HVAC



Chloe Mayhew
Program
Assistant
Swimming Pools,
Appliances,
Electronics,
Emerging
Technologies
Collaborative



Eileen Eaton Senior Program Manager ENERGY STAR Liaison, Lighting, Lighting & Homes for Tomorrow



Kimberly Katz Program Associate Water Heating, Existing Homes, New Construction, Lighting & Homes for Tomorrow



Evaluation and Behavior Committees

Research

- Annual Industry Report survey of EE industry budgets, savings, and expenditures
- ENERGY STAR brand equity survey and report**

Resources

- Behavior Insights and Tools
- Regulatory Overview
- Principles of Evaluation
- Evaluation Planning Criteria



Arlene Lanciani
Principal Program
Manager
Sector Lead,
Evaluation, Program
Performance
Benchmarking



Kira Ashby Senior Program Manager Behavior



Jennifer Smith Program Manager Behavior, Program Performance Benchmarking



Jayne
Piepenburg
Program Manager
Evaluation, Annual
Industry Report

^{**} Supplemental Project

SLOPE Platform

A DOE-led collaboration between NREL and
8 EERE technology offices to create a

dynamic, comprehensive energy planning platform
of integrated, localized data for
state and local decision makers

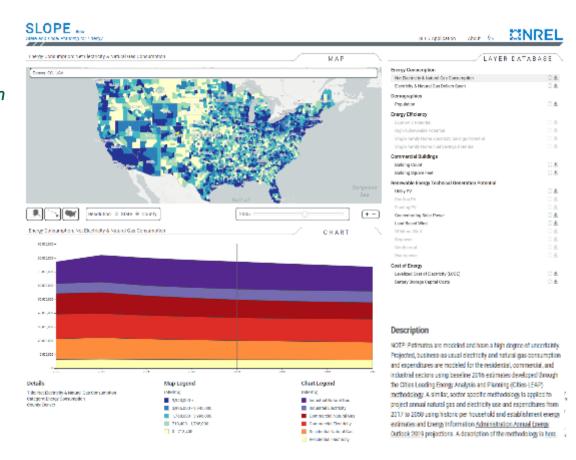
- Phase I: Beta version launched (Jan. 2020)
- Phase II: Adding transportation and generation mix data; enabling user-saved settings (under development in 2020)

Access the Platform:

https://gds.nrel.gov/slope

Comments or Questions?

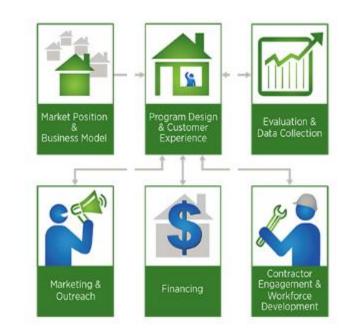
slope@nrel.gov



Explore the Residential Program Solution Center

Resources to help improve your program and reach energy efficiency targets:

- Handbooks explain why and how to implement specific stages of a program.
- Quick Answers provide answers and resources for common questions.
- Proven Practices posts include lessons learned, examples, and helpful tips from successful programs.
- Technology Solutions NEW! present resources on advanced technologies, HVAC & Heat Pump Water Heaters, including installation guidance, marketing strategies, & potential savings.



https://rpsc.energy.gov





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Please send any follow-up questions or future call topic ideas to:





